

IN THE CLAIMS

Claims 1-4 are canceled.

5. (Amended) A [The] router device [of claim 1] for transferring datagrams among networks comprising:

network interfaces connected with networks including at least one virtual connection oriented network;

a memory [for storing] configured to store a correspondence between a virtual connection identifier and a transfer target network interface;

a connection identifier analysis [means for determining] unit configured to determine a transfer target network interface for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection;
and

a transfer [means for transferring] unit configured to transfer the datagram to the transfer target network interface determined by the connection identifier analysis unit,

wherein the memory also stores a correspondence between [a] the virtual connection identifier and a next hop network layer address to be used in a case where network connected with the transfer target network interface is a non-virtual connection oriented network.

6. (Amended) The router device of claim 5, wherein the connection identifier analysis unit [means] also notifies a next hop network layer address for the datagram to the transfer target network interface.

7. (Amended) A [The] router device [of claim 1, further comprising:] for transferring datagrams among networks comprising:

network interfaces connected with networks including at least one virtual connection oriented network;

a memory [for storing] configured to store a correspondence between a virtual connection identifier and a transfer target network interface;

a connection identifier [means for determining] analysis unit configured to determine a transfer target network interface for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection;

a transfer [means for transferring] unit configured to transfer the datagram to the transfer target network interface determined by the connection identifier analysis unit; and

a datagram analysis unit configured to register [means for registering] in advance a correspondence between a datagram content and a transfer target network interface, and to determine [determining] a transfer target network interface for the datagram according to a datagram content of the datagram when the memory does not store the transfer target network interface in correspondence to the virtual connection identifier of the virtual connection[;],

wherein the transfer unit [means] transfers the datagram to the transfer target network interface determined by the datagram analysis unit [means] when the memory does not store the transfer target network interface in correspondence to the virtual connection identifier of the virtual connection.

8. (Amended) A [The] router device [of claim 1] for transferring datagrams among networks comprising:

network interfaces connected with networks including at least one virtual connection oriented network;

a memory [for storing] configured to store a correspondence between a virtual connection identifier and a transfer target network interface;

a connection identifier analysis [means for determining] unit configured to determine a transfer target network interface for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection; and

a transfer [means for transferring] unit configured to transfer the datagram to the transfer target network interface determined by the connection identifier analysis unit,

wherein:

the memory also stores a correspondence between a virtual connection identifier and a quality of service;

the connection identifier analysis unit [means] also determines a quality of service for the datagram by referring to the memory according to a virtual connection identifier of the virtual connection; and

the router device further comprises:

a scheduler configured to apply [means for applying] a priority control for datagrams to be transferred by the router device according to the quality of service determined by the connection identifier analysis unit [means], such that the transfer unit [means] transfers the datagram to which the priority control is applied by the scheduler [means].

9. (Amended) The router device of claim 8, further comprising:

a datagram analysis unit configured to register [means for registering] in advance a correspondence between a datagram content and a transfer target network interface, and to determine [determining] a transfer target network interface for the datagram to which the priority control is applied by the scheduler [means] according to a datagram content of the datagram;

wherein the scheduler [means] makes the priority control of orders in which datagrams are given to the datagram analysis unit [means].

10. (Amended) The router device of claim 8, further comprising:
a processor configured to determine [processing means for determining] a transfer target network interface and/or next hop network layer address and to apply[ing] a network layer processing for the datagram to be transferred by the router device[;],

wherein the scheduler [means] makes the priority control of orders in which datagrams are given to the processor [processing means].

Claim 11 is canceled.

12. (Amended) A [The] router device [of claim 11] for transferring
datagrams among networks comprising:
network interfaces connected with networks including at least one virtual connection
oriented network;
a memory [for storing] configured to store a correspondence between a virtual
connection identifier and a transfer target network interface;
a connection identifier analysis [means for determining] unit configured to determine
a transfer target network interface for a datagram entered from a virtual connection, by
referring to the memory according to a virtual connection identifier of the virtual connection;
a transfer [means for transferring] unit configured to transfer the datagram to the
transfer target network interface determined by the connection identifier analysis unit; and

a datagram processing unit configured to apply network layer processing to the datagram to be transferred by the router device, wherein the datagram processing unit [means] is separately provided for each network interface.

Claims 13-14 are canceled.

15. (Amended) A router device for transferring datagrams among networks, comprising:

at least one network interface connected with at least one virtual connection oriented network;

a memory configured to store [for storing] a correspondence between a virtual connection identifier and a quality of service;

a connection identifier analysis unit configured to determine [means for determining] a quality of service for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection;

a scheduler configured to apply [means for applying] a priority control for datagrams to be transferred by the router device according to the quality of service determined by the connection identifier analysis unit [means]; and

a transfer unit configured to transfer [means for transferring] the datagram to which the priority control is applied by the scheduler [means].

16. (Amended) The router device of claim 15, further comprising:

a datagram analysis unit configured to register [means for registering] in advance a correspondence between a datagram content and a transfer target network interface, and to determine [determining] a transfer target network interface for the datagram to which the

priority control is applied by the scheduler [means] according to a datagram content of the datagram[;],

wherein the scheduler [means] makes the priority control of orders in which datagrams are given to the datagram analysis unit [means].

17. (Amended) The router device of claim 15, further comprising:

a processor configured to determine [processing means for determining] a transfer target network interface and/or next hop network layer address and to apply[ing a] network layer processing for the datagram to be transferred by the router device[;],

wherein the scheduler [means] makes the priority control of orders in which datagrams are given to the processor [processing means].

Claims 18-19 are canceled.

20. (Amended) A router device for transferring datagrams among networks, comprising:

at least one network interface connected with at least one virtual connection oriented network;

a memory configured to store [for storing] a correspondence between a virtual connection identifier and a protocol type information indicating a type and/or a version of a protocol;

a connection identifier analysis unit configured to determine [means for determining] a protocol type information for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection;

a datagram analysis unit configured to determine [means for determining] a transfer target network interface/next hop network layer address for the datagram according to a datagram content of the datagram, the datagram analysis unit [means] having a plurality of processors in correspondence to different protocols, and the datagram is entered into one of said plurality of processors which corresponds to a protocol of a type and/or a version indicated by the protocol type information determined by the connection identifier analysis unit [means]; and

a transfer unit configured to determine [means for transferring] the datagram to the transfer target network interface/next hop network layer address determined by the datagram analysis unit [means].

Claims 21-22 are canceled.

23. (Pending) A method for transferring datagrams among networks, using a router device having at least one network interface connected with at least one virtual connection oriented network, the method comprising the steps of:

storing a correspondence between a virtual connection identifier and a quality of service in a memory provided at the router device;

determining a quality of service for a datagram entered from a virtual connection at the router device, by referring to the memory according to a virtual connection identifier of the virtual connection;

applying a priority control for datagrams to be transferred by the router device according to the quality of service determined by the determining step; and

transferring the datagram to which the priority control is applied by the applying step.

Claims 24-25 are canceled.

26. (Pending) A method for transferring datagrams among networks, using a router device having at least one network interface connected with at least one virtual connection oriented network, the method comprising the steps of:

storing a correspondence between a virtual connection identifier and a protocol type information indicating a type and/or a version of a protocol in a memory provided at the router device;

determining a protocol type information for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection;

determining a transfer target network interface/next hop network layer address for the datagram according to a datagram content of the datagram, wherein a plurality of processors are provided at the router device in correspondence to different protocols, and the datagram is entered into one of said plurality of processors which corresponds to a protocol of a type and/or a version indicated by the protocol type information determined by the determining step; and

transferring the datagram to the determined transfer target network interface/next hop network layer address.

Claims 27-28 are canceled.

29. (Amended) A data communication network system, comprising:
networks including at least one virtual connection oriented network;

a transmission node provided in each network configured to transmit [for transmitting] datagrams such that datagrams with an identical quality of service are transmitted through at least one specific virtual connection; and

a router device configured to connect [for connecting] at least two of the networks, the router device including[:],

at least one network interface connected with said at least two of the networks[:],

a memory configured to store [for storing] a correspondence between a virtual connection identifier and a quality of service[:],

a connection identifier analysis unit configured to determine [means for determining] a quality of service for a datagram entered from a virtual connection, by referring to the memory according to a virtual connection identifier of the virtual connection[:],

a scheduler configured to apply [means for applying] a priority control for datagrams to be transferred by the router device according to the quality of service determined by the connection identifier analysis means[:], and

a transfer unit configured to transfer [means for transferring] the datagram to which the priority control is applied by the scheduler [means].

Claims 30-31 are canceled.

32. (Amended) A data communication network system, comprising:

networks including at least one virtual connection oriented network;

a transmission node provided in each network configured to transmit [for transmitting] datagrams such that datagrams of an identical protocol type and/or version are transmitted through at least one specific virtual connection; and

a router device configured to connect [for connecting] at least two of the networks,
the router device including[:],

at least one network interface connected with said at least two of the networks[:],

a memory configured to store [for storing] a correspondence between a virtual
connection identifier and a protocol type information indicating a type and/or a version of a
protocol[:],

a connection identifier analysis unit configured to determine [means for determining]
a protocol type information for a datagram entered from a virtual connection, by referring to
the memory according to a virtual connection identifier of the virtual connection[:],

a datagram analysis unit configured to determine [means for determining] a transfer
target network interface/next hop network layer address for the datagram according to a
datagram content of the datagram, the datagram analysis unit [means] having a plurality of
processors in correspondence to different protocols, and the datagram is entered into one of
said plurality of processors which corresponds to a protocol of a type and/or a version
indicated by the protocol type information determined by the connection identifier analysis
unit [means:], and

a transfer unit configured to transfer [means for transferring] the datagram to the
transfer target network interface/next hop network layer address determined by the datagram
analysis unit [means].

Claim 33 is canceled.

34. (Amended) A transmission node device for transmitting datagrams to a router
device, comprising:

a memory configured to store [for storing] a correspondence between a quality of service specifying information indicating a quality of service and an output virtual connection identifier, the correspondence being known to the router device;

a datagram analysis unit configured to determine [means for determining] an output virtual connection identifier for a datagram to be transmitted, by referring to the memory according to a quality of service specifying information of the datagram; and

a transmission unit configured to transfer [means for transmitting] the datagram to a virtual connection having a virtual connection identifier identical to the output virtual connection identifier determined by the datagram analysis unit [means], such that datagrams with an identical quality of service specifying information are transmitted through at least one specific virtual connection.

35. (Amended) A transmission node device for transmitting datagrams to a router device, comprising:

a memory configured to store [for storing] a correspondence between a protocol type information indicating a type and/or a version of a protocol and an output virtual connection identifier, the correspondence being known to the router device;

a datagram analysis unit configured to determine [means for determining] an output virtual connection identifier for a datagram to be transmitted, by referring to the memory according to a type and/or a version of a protocol of the datagram; and

a transmission unit configured to transmit [means for transmitting] the datagram to a virtual connection having a virtual connection identifier identical to the output virtual connection identifier determined by the datagram analysis unit [means], such that datagrams of an identical protocol type and/or version are transmitted through at least one specific virtual connection.

Claim 36 is canceled.

37. (Pending) A method for transmitting datagrams to a router device, comprising the steps of:

storing in a memory a correspondence between a quality of service specifying information indicating a quality of service and an output virtual connection identifier, the correspondence being known to the router device;

determining an output virtual connection identifier for a datagram to be transmitted, by referring to the memory according to a quality of service specifying information of the datagram; and

transmitting the datagram to a virtual connection having a virtual connection identifier identical to the output virtual connection identifier determined by the determining step, such that datagrams with an identical quality of service specifying information are transmitted through at least one specific virtual connection.

38. (Pending) A method for transmitting datagrams to a router device, comprising the steps of:

storing in a memory a correspondence between a protocol type information indicating a type and/or a version of a protocol and an output virtual connection identifier, the correspondence being known to the router device;

determining an output virtual connection identifier for a datagram to be transmitted, by referring to the memory according to a type and/or a version of a protocol of the datagram; and

transmitting the datagram to a virtual connection having a virtual connection identifier identical to the output virtual connection identifier determined by the determining step, such that datagrams of an identical protocol type and/or version are transmitted through at least one specific virtual connection.

39. (New) A router device for transferring datagrams among networks comprising:
network interfaces connected with networks including at least one virtual connection
oriented network and at least one non-virtual connection oriented network;

a memory configured to store a correspondence between a virtual connection
identifier and a transfer target network interface, and also to store a correspondence between
the virtual connection identifier and a network layer address;

a first connection identifier analysis unit configured to determine a transfer target
network interface for a datagram entered from a virtual connection, by referring to the
memory according to a virtual connection identifier of the virtual connection;

a second connection identifier analysis unit configured to determine a transfer target
network layer address for the datagram entered from the virtual connection, by referring to
the memory according to the virtual connection identifier of the virtual connection;

a first transfer unit configured to transfer the datagram to the transfer target network
interface connected with another virtual connection oriented network, when the transfer target
network interface is determined by the first connection identifier analysis unit; and

a second transfer unit configured to transfer the datagram to the transfer target
network interface connected with the at least one non-virtual connection oriented network
toward the transfer target network layer address, when the transfer target network layer
address is determined by the second connection identifier analysis unit.

40. (New) A router device according to claim 39, wherein:
the transfer target network interface is configured to transfer the datagrams toward a
datalink address determined using the transfer target network layer address.

41. (New) A router device according to claim 39, wherein:
a transfer target of the datagram is determined without referring to the datagram
content.

42. (New) A method for transferring datagrams among networks, using a router
device having network interfaces connected with networks including at least one virtual
connection oriented network and at least one non-virtual connection oriented network, the
method comprising the steps of:

storing a correspondence between a virtual connection identifier and a transfer target
network interface in a memory provided at the router device, and also storing a
correspondence between the virtual connection identifier and a network layer address

first determining a transfer target network interface for a datagram entered from a
virtual connection at the router device, by referring to the memory according to a virtual
connection identifier of the virtual connection;

second determining a transfer target network layer address for the datagram entered
from the virtual connection, by referring to the memory according to the virtual connection
identifier of the virtual connection;

first transferring the datagram to the transfer target network interface connected with
another virtual connection oriented network, when the transfer target network interface is
determined by the first determining step; and

second transferring the datagram to the transfer target network interface connected with the at least one non-virtual connection oriented network toward the transfer target network layer address, when the transfer target network layer address is determined by the second determining step.

43. (New) A method according to claim 42, wherein:

the step of second transferring transmits the datagrams from the transfer target network interface toward a datalink address determined using the transfer target network layer address.

44. (New) A method according to claim 42, wherein:

the step of determining the transfer target network layer address is performed without referring to the datagram content.

45. (New) A method for transferring datagrams among networks, using at least two router devices having network interfaces connected with networks including at least one virtual connection oriented network, the method comprising the steps of:

storing a correspondence between a virtual connection identifier and a transfer target network interface in a memory provided at a router device;

determining a transfer target network interface for a datagram entered from a virtual connection at the router device, by referring to the memory according to a virtual connection identifier of the virtual connection on which the datagram is received;

transferring the datagram to the transfer target network interface determined by the determining step;

first transmitting the datagram along with another virtual connection identifier from the transfer target network interface over a second virtual connection to another router device;
receiving the datagram, at said another router device, from the transfer target network interface at the router device over the second virtual connection;
removing said another virtual connection identifier from the datagram at said another router device; and
second transmitting said datagram, at said another router device, away from said another router device without said another virtual connection identifier, and without adding another virtual connection identifier.

46. (New) A method according to claim 45, wherein said step of second transmitting said datagram away from said another router device comprises transmitting said datagram over a non-virtual connection oriented network.

47. (New) A method according to claim 46, wherein said step of second transmitting said datagram way from said another router device comprises transmitting said datagram to a location using a network layer address associated with the datagram.

48. (New) A method according to claim 45, wherein said step of second transmitting said datagram way from said another router device comprises transmitting said datagram to a location using a network layer address associated with the datagram.

49. (New) A method according to claim 48, wherein said step of second transmitting said datagram way from said another router device comprises transmitting said datagram

without referring to the datagram content to a location using a network layer address associated with the datagram.

50. (New) A method for transferring datagrams among networks, using a router device having network interfaces connected with networks including at least one virtual connection oriented network, the method comprising the steps of:

storing a correspondence between a virtual connection identifier and a transfer target network interface in a memory provided at the router device;

determining a transfer target network interface for a datagram entered from a virtual connection at the router device, by referring to the memory according to a virtual connection identifier of the virtual connection on which the datagram is received;

transferring the datagram to the transfer target network interface determined by the determining step; and

transmitting said datagram from the router device without said virtual connection identifier, and without adding another virtual connection identifier.

51. (New) A plurality of router devices for transferring datagrams among networks, comprising:

a first router device including,

a first set of network interfaces connected to at least a first virtual connection oriented network,

a first memory configured to store a first correspondence between a first input virtual connection identifier and a first transfer target network interface,

a first connection identifier analysis unit configured to determine the first transfer target network interface for a first datagram entered from a first input virtual connection, by

referring to the first memory according to the first input virtual connection identifier of the first virtual connection, and

a first transfer unit configured to transfer the first datagram to the first transfer target network interface determined by the first connection identifier analysis unit; and

a second router device including,

a second set of network interfaces connected to at least a second virtual connection oriented network,

a second memory configured to store a second correspondence between a second input virtual connection identifier and a next hop layer address to be used in a case where the second set of network interfaces is connected to at least a non-virtual connection oriented network,

a second connection identifier analysis unit configured to determine a second transfer target network interface for a second datagram entered from a second input virtual connection, by referring to the second memory according to the second input virtual connection identifier of the second virtual connection, and

a second transfer unit configured to transfer the second datagram to the second transfer target network interface determined by the second connection identifier analysis unit.

52. (New) A method for transferring datagrams among networks, using a first router device and a second router device having network interfaces connected with networks including at least one virtual connection oriented network, the method comprising the steps of:

storing a correspondence between a first virtual connection identifier and a first transfer target network interface in a memory provided at the first router device;

determining a first transfer target network interface for a datagram entered from a first virtual connection at the first router, by referring to the memory provided at the first router device according to a virtual connection identifier of the first virtual connection;

transferring the datagram entered from the first virtual connection to the first transfer target network interface determined by the determining step;

storing a correspondence between a second virtual connection identifier and a second transfer target network interface in a memory provided at the second router device, said second transfer target network interface being connected to a next hop network layer address to be used in a case where the network interfaces of the second router is connected to at least a non-virtual connection oriented network;

determining a second transfer target network interface for a datagram entered from a second virtual connection at the second router, by referring to the memory provided at the second router device according to a virtual connection identifier of the second virtual connection;

transferring the datagram entered at the second virtual connection to the second transfer target network interface determined by the determining step.

53. (Amended) A plurality of router devices for transferring datagrams among networks, comprising:

a first router device including,

a first set of network interfaces connected to at least a first virtual connection oriented network,

a first memory configured to store a first correspondence between a first input virtual connection identifier and a first output virtual connection identifier,

a first connection identifier analysis unit configured to determine the first transfer target network interface for a first datagram entered from a first input virtual connection, by referring to the first memory according to the first input virtual connection identifier of the first virtual connection, and

a first transfer unit configured to transfer the first datagram to the first transfer target network interface determined by the first connection identifier analysis unit

a second router device including,

a second set of network interfaces connected to at least a second virtual connection oriented network,

a second memory configured to store a second correspondence between a second input virtual connection identifier, a second transfer target network interface, and a second output virtual connection identifier,

a second connection identifier analysis unit configured to determine the second transfer target network interface for a second datagram entered from a second input virtual connection, by referring to the second memory according to the second input virtual connection identifier of the second virtual connection, and

a second transfer unit configured to transfer the second datagram to the second transfer target network interface determined by the second connection identifier analysis unit without attaching said second output virtual connection identifier to said second datagram.

54. (Amended) A method for transferring datagrams among networks, using a first router device and a second router device having network interfaces connected with networks including at least one virtual connection oriented network, the method comprising the steps of:
storing a correspondence between a first virtual connection identifier and a first transfer target network interface in a memory provided at the first router device;

determining a first transfer target network interface for a datagram entered from a first virtual connection at the first router, by referring to the memory provided at the first router device according to a virtual connection identifier of the first virtual connection;

transferring the datagram entered from the first virtual connection to the first transfer target network interface determined by the determining step;

storing a correspondence between a second virtual connection identifier and a second transfer target network interface in a memory provided at the second router device;

determining a second transfer target network interface for a datagram entered from a second virtual connection at the second router, by referring to the memory provided at the second router device according to a virtual connection identifier of the second virtual connection; and

transferring the datagram entered at the second virtual connection to the second transfer target network interface determined by the determining step without attaching an output virtual connection identifier to said datagram entered from the second virtual connection.